

ATTACHMENT FOR A SUCTION DEVICE**FIELD OF THE INVENTION**

The present invention relates to a suction system, and more specifically, to an attachment for a suction device for removing embedded hair from a fabric surface.

5 BACKGROUND INFORMATION

Suction devices, for instance vacuum cleaners, are very well known for removing dirt, dust, etc. from a surface desired to be cleaned. One of the problems experienced by conventional suction devices, however, is that they are incapable of satisfactorily removing embedded hair from a surface to be cleaned. This is particularly true of fabric
10 surfaces, such as furniture, drapes, curtains, etc., as well as floors, e.g., wood floors, that have narrow spaces therein.

Although there are many ways in which hair may become embedded in a surface, the problem of embedded hair is most commonly experienced by pet owners. Pets, such as cats and dogs, very often come into contact with furniture that is made of
15 fabric, such as couches, chairs, etc. as well as floors having spaces therein. By way of example, when pets come into contact with fabric, for instance by sleeping on or rubbing against the fabric, pet hair may be partially pushed into, e.g., embedded in, the fabric such that a portion of each piece of hair extends into the fabric and a portion of each piece of hair extends out of the fabric.

20 As any pet owner will attest, conventional vacuum cleaners do not adequately remove the embedded pet hair from surfaces. The frictional forces that maintain each piece of embedded hair in the fabric of furniture or in the spaces of a wood floor are simply not overcome by either the suction force exerted by conventional suction devices, nor by the agitating effect that is caused by the rotating brushes of
25 conventional suction devices. Still further, though many conventional suction devices include vacuum tools, used in conjunction with a hose, that have combs or brushes disposed thereon, these vacuum tools are also incapable of adequately remove the embedded pet hair from such surfaces. Rather, the combs/brushes of these vacuum

tools slide ineffectively over the embedded hair without removing the embedded hair from the surface.

It is therefore an object of the present invention to provide a device for removing embedded hair from a surface.

SUMMARY OF THE INVENTION

The present invention, according to one example embodiment thereof, relates to an attachment device for a suction system. The suction system, e.g., a vacuum cleaner, has an opening through which a suction force is experienced. The attachment device includes a hair extraction element configured to be positioned adjacent to and/or covering at least a portion of the opening. The hair extraction element is formed of a material, such as rubber, plastic, latex, vinyl and neoprene, etc. that, when slidably moved across a surface having embedded hair, is capable of extracting the embedded hair from the surface. Once the embedded hair has been extracted, the hair may be suctioned through the opening of the suction system.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic diagram that illustrates the salient features of a suction system having an attachment for a suction device, in accordance with one embodiment of the present invention;

Figure 2 is perspective view that illustrates an attachment for a suction device, in accordance with one embodiment of the present invention;

Figure 3 is perspective view that illustrates an attachment for a suction device, according to another embodiment of the present invention;

Figure 4 is perspective view that illustrates an attachment for a suction device, according to still another embodiment of the present invention; and

Figure 5 is perspective view that illustrates an attachment for a suction device, according to still another embodiment of the present invention.

DETAILED DESCRIPTION

5 Figure 1 is a schematic diagram that illustrates the salient features of a suction system 5 having an attachment for a suction device 10, in accordance with one embodiment of the present invention. For instance, Figure 1 illustrates a suction device 10. The suction device 10 may be any device capable of causing a suction force to be experienced. Preferably, the suction device 10 is a vacuum cleaner or the like. The
10 present invention may include any type of vacuum cleaner, e.g., upright, canister, wet/dry vac, etc.

 In the embodiment shown, the suction device 10 has at least one opening, e.g., opening 10a, through which the suction force is experienced. Attached to the opening 10a of the suction device 10 is one end 40a of a hose 40. Advantageously, the hose
15 40 is a flexible hose of the type typically provided with conventional vacuum cleaners. Such a hose is typically employed so as to enable a user to reach a surface that is desired to be vacuumed, but which is not easily accessible with the larger suction device 10. For instance, surfaces such as furniture, upholstery, draperies, curtains, etc.
20 are some of the many types of surfaces that may be desired to be vacuumed, but which are not easily accessible with the main suction opening of conventional vacuum cleaners.

 In the embodiment shown, the other end 40b of the hose 40 is attached to an opening 30a of a vacuum tool 30. The vacuum tool 30 also has a second opening 30b through which the suction is experienced. Advantageously, the vacuum tool 30 is any
25 one of the numerous different types of vacuum tools typically provided with conventional vacuum cleaners. The vacuum tool 30 may be of the type which is typically employed so as to change the shape and/or the size of the second end 40b of the hose 40. For instance, if the second end 40b of the hose 40 is round in shape when viewed cross-sectionally, the vacuum tool 30 may be configured so as to have a
30 first opening 30a that is round for mating with the round end 40b of the hose 40, and

may also have a second opening 30b having a different, e.g., an elongated oval or rectangular, cross-sectional shape. The use of a vacuum tool 30 that has, as its second opening 30b, an elongated oval or rectangular cross-sectional shape enables a wider area to be suctioned when the second opening 30b is moved over a surface by virtue of the second opening 30b being wider than the diameter of the second end 40b of the hose 40. It should be recognized that, in various embodiments of the present invention, the second opening 30b of the vacuum tool 30 may have the same or a different cross-sectional shape relative to the hose 40. Furthermore, it should be recognized that, in various embodiments of the present invention, the cross-sectional area of the second opening 30b of the vacuum tool 30 may be smaller than, the same size as, or larger than the cross-sectional area of the hose 40.

In the embodiment shown, the second opening 30b of the vacuum tool 30 is attached to a hair extraction element 20. The hair extraction element 20 functions to extract hair, particularly hair that is embedded in the surface, e.g., a fabric surface, to be suctioned. The hair extraction element 20 is formed of a material that, when slidably moved across a surface having hair embedded therein, is capable of extracting the embedded hair from the surface. For instance, according to one embodiment of the present invention, the hair extraction element 20 is formed from a rubber material, such as the rubber used for conventional rubber kitchen gloves of the type advertised for protecting hands while washing dishes. Of course, it should be recognized that the hair extraction element 20 may be formed from any type of material, be it rubber, plastic, latex, vinyl, neoprene, etc., provided that the material is capable of extracting hair that is embedded in a surface, e.g., a fabric surface. In addition, the hair extraction element 20 may be either smooth or textured so as to further enable it to extract hair that is embedded in a surface.

There are various different arrangements and configurations possible for the hair extraction element 20. For instance, when the hair extraction element 20 is attached to a vacuum tool 30 as illustrated in Figure 1, the hair extraction element 20 may be arranged in various different ways relative to the vacuum tool 30. Figures 2 through 5 illustrate several different arrangements of the hair extraction element 20.

Figure 2 illustrates a vacuum tool 30 that has a first opening 30a that is round, so as to mate with the second end 40b of a hose 40 that has a round cross-sectional shape, and a second opening 30b that has a substantially rectangular cross-sectional shape that is wider than the diameter of the hose 40. In this embodiment, the hair extraction element 20 may be configured as a strip of material that is adjacent to an edge 301 of the second opening 30b. Preferably, the edge 301 of the second opening 30b is a leading edge of the vacuum tool 30, e.g., the edge of the vacuum tool 30 that, when the vacuum tool 30 is slidably moved over a surface to be suctioned, is the first edge to encounter the surface. While Figure 2 illustrates one embodiment of the present invention in which the hair extraction element 20 is configured as a strip of material that is adjacent to only one edge, e.g., edge 301, of the second opening 30b, in other embodiments the hair extraction element 20 may be configured as a strip of material that extends around the second opening 301 and that is adjacent to more than one edge of the second opening 30b, or else the hair extraction element 20 may be configured as several strips of material each of which extends around at least a portion of the second opening 301 and each of which is adjacent to one or more edges of the second opening 30b.

In these embodiments, the hair extraction element 20 may be permanently attached to the vacuum tool 30. Alternatively, the hair extraction element 20 may be detachable from the vacuum tool 30 so as to be replaceable when the hair extraction element 20 wears out. The present invention contemplates that the hair extraction element 20 may be attached, either permanently or detachably, to the vacuum tool 30 in any known manner including, by way of non-limiting example, by adhesive, clips, snaps, Velcro, etc.

Figure 3 also illustrates a vacuum tool 30 that has a first opening 30a that is round, so as to mate with the second end 40b of a hose 40 that has a round cross-sectional shape, and a second opening 30b that has a substantially rectangular cross-sectional shape that is wider than the diameter of the second end 40b of the hose 40. In this embodiment, the hair extraction element 20 is configured as a sheet of material that covers at least a portion of the second opening 30b. While Figure 3 illustrates one

embodiment of the present invention in which the hair extraction element 20 is configured as a sheet of material that extends over the entire second opening 30b, in other embodiments the hair extraction element 20 may be configured as a sheet of material that extends over a smaller portion of the second opening 30b.

5 In these embodiments, the hair extraction element 20 may also include one or more orifices 32 through which suction may be experienced. For instance, as illustrated in Figure 3, the hair extraction element 20 may include orifices, such as rectangular orifices 32a, 32b, 32c, 32d and 32e. The orifice 32c, located in substantially the center of the second opening 30b of the vacuum tool 30, is larger than the remaining orifices,
10 each of which is arranged substantially longitudinally relative to each other. It should be recognized that, while Figure 3 illustrates the hair extraction element 20 having five different orifices, any number of orifices may be employed. Furthermore, it should be recognized that, while Figure 3 illustrates the hair extraction element 20 having rectangular-shaped orifices, orifices of any shape may be employed. Still further, it
15 should be recognized that, while Figure 3 illustrates the hair extraction element 20 having the orifices arranged substantially longitudinally relative to each other, any arrangement of the orifices may be employed. It should also be recognized that, while Figure 3 illustrates the hair extraction element 20 having orifices of a particular size relative to each other and relative to the size of the second opening 30b of the vacuum
20 tool 30, orifices of any size may be employed.

In these embodiments, the hair extraction element 20 may be permanently attached to the vacuum tool 30. Alternatively, the hair extraction element 20 may be detachable from the vacuum tool 30 so as to be replaceable when the hair extraction element 20 wears out. The present invention contemplates that the hair extraction
25 element 20 may be attached, either permanently or detachably, to the vacuum tool 30 in any known manner including, by way of non-limiting example, by adhesive, clips, snaps, Velcro, etc. In the embodiment shown in Figure 3, the hair extraction element 20 is shaped so as to fit over the second opening 30b of the vacuum tool 30, and to be retained in position on the vacuum tool 30 by virtue of friction between the hair
30 extraction element 20 and the vacuum tool 30.

Figure 4 illustrates an arrangement in which the hair extraction element 20 may be detachable from the vacuum tool 30 so as to be replaceable when the hair extraction element 20 wears out. For instance, in Figure 4, the hair extraction element 20 is connected to the vacuum tool 30 by means of at least one connection element 50. In this embodiment, the connection elements 50 are clips that are permanently attached to one of the vacuum tool 30 and the hair extraction element 20 and that is detachably clipped to the other one of the vacuum tool 30 and the hair extraction element 20, and that function to retain the hair extraction element 20 in position on the vacuum tool 30.

Figure 5 also illustrates an arrangement in which the hair extraction element 20 may be detachable from the vacuum tool 30 so as to be replaceable when the hair extraction element 20 wears out. In Figure 5, the hair extraction element 20 is connected to the vacuum tool 30 by means of connection elements 51. In this embodiment, the connection elements 51 are clips that are not permanently attached to the vacuum tool but rather that are configured to retain at least two portions, e.g., two edges, of the hair extraction element 20 relative to each other. In this manner, the hair extraction element 20 is positioned over the second opening 30b of the vacuum tool 30 such that two edges of the hair extraction element 20 are brought into contact with each other adjacent to the first opening 30a of the vacuum tool 30. The connection elements 51 are then employed to attach the two edges of the hair extraction element 20 to each other, thereby maintaining the hair extraction element 20 in position on the vacuum tool 30. In one embodiment of the present invention, the connection elements 51 are conventional binder clips or the like.

It should be recognized that, while Figure 1 illustrates the hair extraction element 20 being a separate and discrete element, such as a kit, that is configured to be either permanently or detachably attached to a vacuum tool 30, the present invention also contemplates that the hair extraction element 20 may be integrally formed with the vacuum tool 30. Also, it should be recognized that, in other embodiments of the present invention, the hair extraction element 20 may be a separate and discrete element that is configured to be either permanently or detachably attached directly to the hose 40, rather than to the vacuum tool 30 that is connected to the hose 40,

thereby eliminating the need for the vacuum tool 30. In addition, it should be recognized that, in other embodiments of the present invention, the hair extraction element 20 may be integrally formed with the hose 40.

Furthermore, it should be recognized that, in other embodiments of the present invention, the hair extraction element 20 may be a separate and discrete element that is configured to be either permanently or detachably attached directly to the suction device 10, e.g., a main suction opening of a vacuum cleaner, rather than to a vacuum tool 30 that is connected to the suction device 10 via a hose 40. Thus, the need for the vacuum tool 30 and the hose 40 may be eliminated. Still further, it should be recognized that, in other embodiments of the present invention, the hair extraction element 20 may be integrally formed with the suction device 10. In those embodiments of the present invention in which the hair extraction element 20 is either configured to be attached to, or that is integrally formed with, the suction device 10, the hair extraction element is preferably configured so as to avoid contact with any moving components of the suction device, e.g., rotating brushes, wheels, etc.

The operation of the suction system 5 will hereinafter be described in connection with the embodiment illustrated in Figure 1. In operation, the suction device 10 is turned "on" so as to cause a suction force to be experienced at opening 10a, through the hose 40, and through the vacuum tool 30. The vacuum tool 30 is placed by an operator such that the second opening 30b of the vacuum tool 30, and particularly the hair extraction element 20 that is located at the second opening 30b, is in contact with a surface, e.g., a fabric surface, to be suctioned. As previously mentioned, the surface may have hair, such as pet hair, embedded therein. The vacuum tool 30 is then slidably moved over the surface, whereby the hair extraction element 20 is brought into frictional contact with the portions of the embedded hair that is extending out of the surface. As the vacuum tool 30 is slidably moved over the surface, the frictional contact of the hair extraction element 20 and the portions of the embedded hair that is extending out of the surface causes the embedded hair to be pulled out of the surface, whereupon the previously embedded hair may be removed by suction through the second opening 301 of the vacuum tool 30. In the embodiment shown for instance in

Figure 2, the hair extraction element 20, in the form of one or more strips of material located at one or more edges of the second opening 30b, causes the embedded hair to be pulled out of the surface, whereupon the previously embedded hair may be removed by suction through the second opening 30b of the vacuum tool 30. In the embodiment shown for instance in Figures 3 and 4, the hair extraction element 20, in the form of a sheet of material covering at least a portion of the second opening 30b, causes the embedded hair to be pulled out of the surface, whereupon the previously embedded hair may be removed by suction first through the orifices 32a to 32e of the hair extraction element 20 and then through the second opening 30b of the vacuum tool 30.

As set forth more fully above, conventional suction devices are incapable of satisfactorily removing embedded hair from a surface to be cleaned, because the frictional forces that maintain each piece of embedded hair in the surface are simply not overcome by either the suction force exerted by conventional suction devices, by the agitating effect of rotating brushes of conventional suction devices, or by the combs or brushes disposed on conventional vacuum tools. Rather, when a surface that has hair embedded therein is cleaned using a conventional suction device, two steps are typically required to be performed. In a first step, a conventional suction device is used to remove dirt, dust, etc. from the surface. A second step is then performed to remove the embedded hair that was not removed by the performance of the first step. This second step may include using an adhesive lint roller on the surface, or manually pulling the embedded hair out of the surface. Thus, because of the need to perform two steps, the complete cleaning with a conventional suction device of a fabric surface having hair embedded therein takes an undesirably long amount of time. In contrast, the present invention, according to the various embodiments described above, enables a surface having hair embedded therein to be completely cleaned in a single step, saving time as compared to the use of conventional suction devices. Furthermore, because the present invention, according to some of the various embodiments described above, may be employed as an attachment to a conventional suction device, there may be eliminated the need to purchase a new suction device.

Thus, the several aforementioned objects and advantages of the present invention are most effectively attained. Those skilled in the art will appreciate that numerous modifications of the exemplary example embodiments described hereinabove may be made without departing from the spirit and scope of the invention.

- 5 Although various exemplary example embodiments of the present invention have been described and disclosed in detail herein, it should be understood that this invention is in no sense limited thereby and that its scope is to be determined by that of the appended claims.